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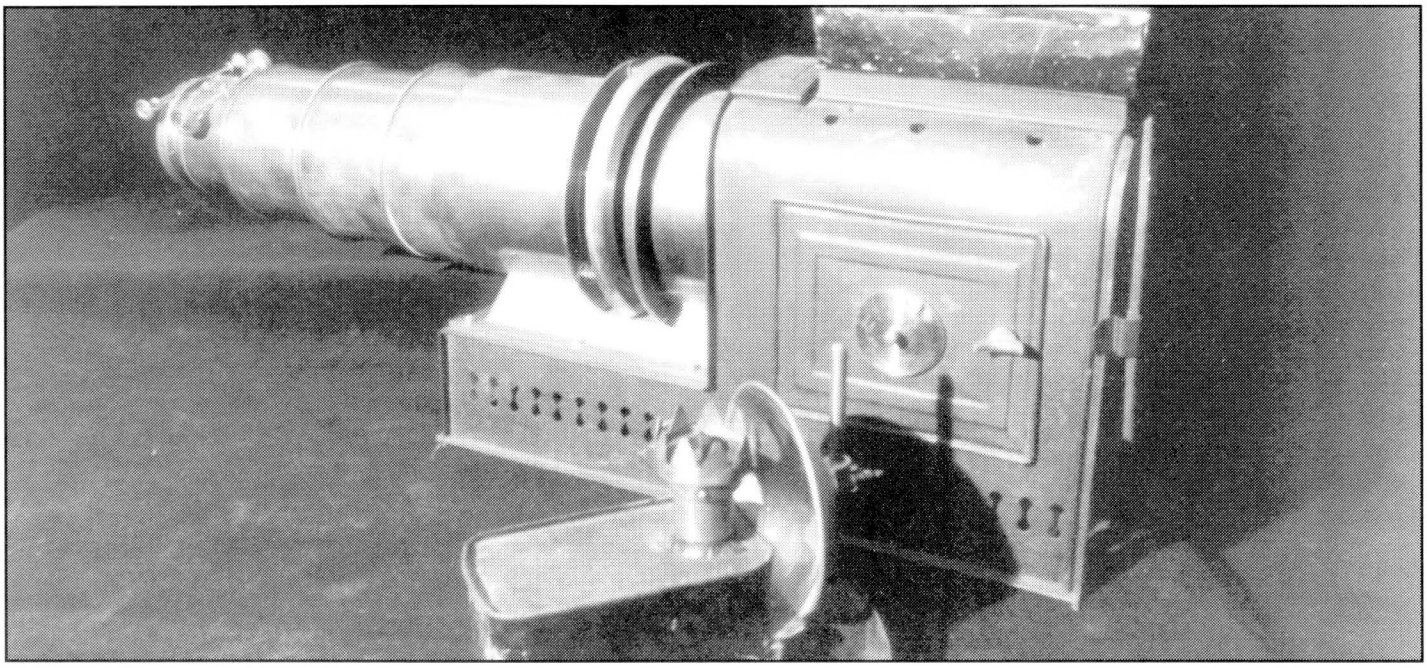

NEW LAMPS FOR OLD

BY JOHN A DAVIDSON

1. Modern Light Sources for the Old Lantern.

2. Thoughts on Slide conversion or Keep the Lantern Light Low!

Abstract - Modern incandescent lamp equivalents have been computed to match the light output of various historic light sources used in the magic lantern (gas lights, kerosene lamps, lime lights, etc.). These calculations show that a modern 3200 Knprojection lamp of 100-200 watts will probably suffice in most cases and specific recommendations are made. For a 200 watt lamp, calculations reveal that in **one minute of**

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- NEW LAMPS FOR OLD
- THE KLONDIKE LANTERN
- A DIFFERENT NOTE ON KIRCHER
- MAGIC LANTERN DISPLAY

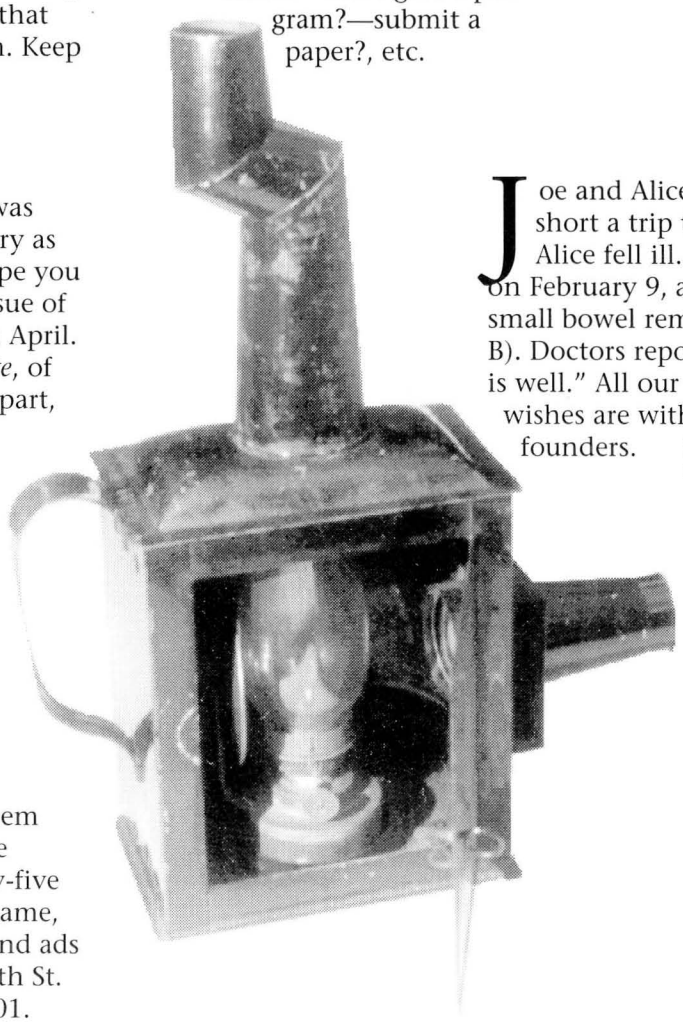
EDITORIAL COMMENT

We wish to thank all members for sending in material for the *Gazette*. Your articles are much appreciated, but we would like for you to edit your own work before sending it on. It will still be subject to editing at this end. We would prefer that fiction be held to a minimum. Keep the articles coming!

Our N.W. newsletter was mailed out in February as sort of a filler. We hope you enjoyed it? The fall/winter issue of the *Gazette* was mailed out in April. The spring issue of the *Gazette*, of which these comments are a part, was mailed out in May. The deadline for submitting material for the summer issue is June 1, which will be mailed out approximately July 15, 1993. The fall issue October 15.

Again, send in your want ads! As I stated before, people find them interesting. You may even see something you need? Twenty-five words or less, do not count name, address or phone number. Send ads directly to Joe Koch, 2902 28th St. SE, Auburn, Wash. 98002-7901.

It's time to start thinking and planning for the convention, June 1994. Arrange your vacation time—bring something to sell—will I fly or drive?—can I give a program?—submit a paper?, etc.



Joe and Alice Koch had to cut short a trip to California when Alice fell ill. She was operated on February 9, and a section of small bowel removed (Lymphoma-B). Doctors report on March 9—"All is well." All our prayers and good wishes are with you our revered founders.

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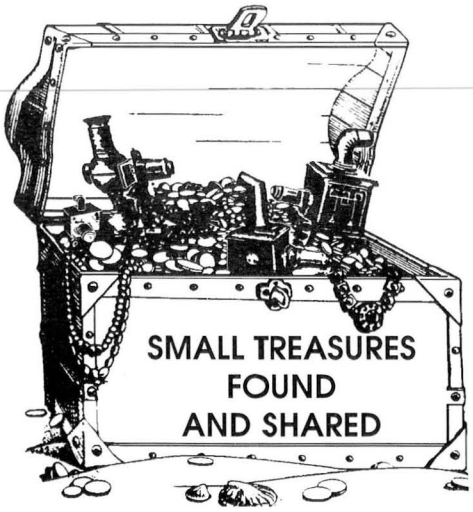


NOTES FROM THE PRESIDENT

Though it was a bit delayed, I am sure you will have received and enjoyed the newest *Gazette*, with lots of information about our recent convention.

By the time you receive this issue, you will likely have heard of the British Society, called THE Society, convention in London which runs April 16, 17 and 18. Some of us from the Colonies are planning to attend. The Bortons are to perform, and I am to give an update on the activities over here since the last convention in London. Our presentation will most clearly reflect that our Society is alive and well, and making significant contributions to the Magic Lantern history field, individually and collectively.

I will report on the London convention in the next issue, including information on a number of new publications that might be available, who made it over from this side of the pond, and maybe some pics of our attendees, and the convention in general.

While on the subject of over there, please be sure to send me any and all comments you have regarding member Mike Smith's letter in the last issue, so that I might have the broadest possible response to his proposal. Mike is the Treasurer of THE Society in Britain.

I believe you will be glad to see the *Gazette* back on track after a bit of production delay, and every effort will be made to meet our goal of at least four times per year publication, with some news of the members and some meaty articles for your continued education about the history of the magic lantern. Please let me know of any magic lantern related subjects on which you would like to see an article, or any such article you wish to submit for consideration.

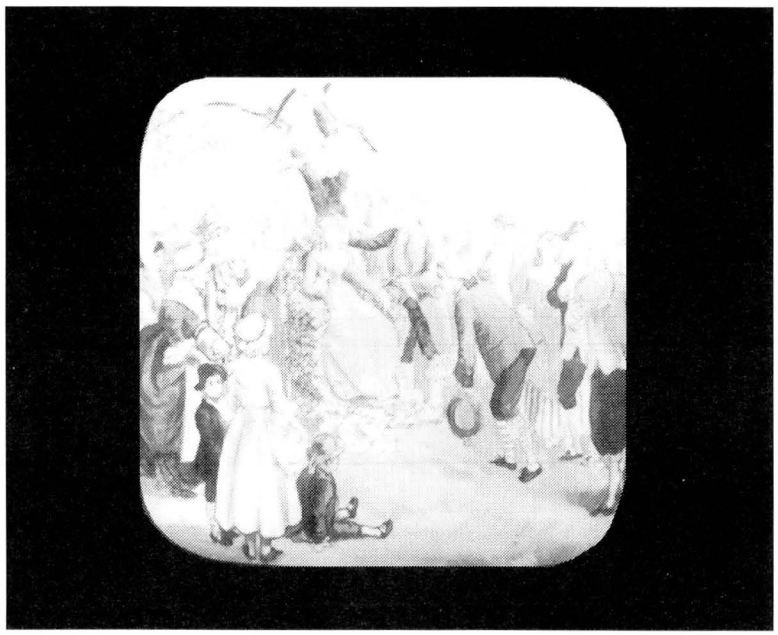
SMALL TREASURES FOUND AND SHARED

Volume 7, Number 1, of *Rittenhouse,* pages 9 through 15, contain a very nice article entitled projection apparatus for science in the late 19th century America, by Debbie Griggs. It is most interesting though not much illustration. It does contain 13 items in the bibliography, some of which are not commonly referred to.

Once again I recommend this publication to the members, with the caveat that it is called the *Journal of the American Scientific Instrument Enterprise.* For $25/year subscription, write to *The Antiquarian Scientist*, P.O. Box 367, Dracut, Mass., 01826. Who knows, it may start you off on another collecting field, but I must say a pricey one.

A SOURCE FOR SLIDE COVER GLASS

Elgin Smith has furnished some information on a source for the American format (3 1/4 x 4) slide cover glass, through the EMDE Products, Co., P.O. Box 10041, Torrance, Calif. 90505. Phone (310) 514-EMDE. Attn: Mr. George Skelly. They apparently sell the glass in lots of 100 pieces. They also may still carry lantern slide binders in the same format in boxes of 50. Best to check for current prices. Thanks for the lead Elgin.



Slide Image courtsey of Ray Gilbert, England. Slide is part of a slide set called "The May Queen", poem by Tennysn.

projection a slide receives or exceeds the **daily** amount of exposure to light recommended for "light sensitive" materials in the museum environment (50 lux for 8 hours).

The implication is that colored slides should be projected for no more than one minute per day, or less over the long run. Under no circumstances should colored slides be hung in an ordinary window or damage may occur in a very short time.

The screen brightness achieved by the early lantern is shown to be generally 10% less of the modern accepted values. Both authentic recreation of early lantern shows, and slides conservation practices for colored slides, suggest that light levels in the lantern be kept as low a level as possible.

They come with lamps the size of grapefruits or catsup bottles, or if you are lucky, with oil lamps, electric arc or lime lights. All of these sources (illuminates) have one thing in common—they give out more heat than light! Although modern sources (illuminates) for the same, they are still much more efficient than their predecessor. One projection manual states that as many as 30% of the slides might be cracked and ruined during a show equipped with a high intensity arc lamp; with every slide today being essentially irreplaceable, new, more efficient, and cooler light sources should be installed. The new lamps need to be installed in such a way as to be compatible with any historic light source that might be present. Lots of times we are "fortunate" and there is not any longer any historic light source to worry about.

Before going too far let us consider the light outputs of the traditional sources for the magic lantern. These are gathered together in Table 1 from a variety of sources, and although the author makes no claim for an exhaustive search, Table 1 probably gives a fairly good survey.

Table I

Photometric Data for Various Light Sources: Used in Magic Lanterns

Source	Candle Power (cp) (Candela)	Recommended Illuminated Circle (Feet)	Foot Candles on screen
Illuminating Gas	15[3]	—	
Illuminating Gas	20-185[2]	—	
Illuminating Gas	6-20[7]	—	
Welsbach Gas Light	60[7]	—	
Kerosene in Argand Burner	20[3]	6-8[1]	.14-.08
Kerosene in Argand Burner	30-40[3]	8-10[3]	.16-.10
Kerosene in Argand Burner	30[5]	—	
3 Wick Magic Lantern Lamp (Lilly & Co., 1899)	128[4]	Clear/Distant 8[4] Max 12[4]	.51 .22
Marcy's Stereoptican Lamp	25[3] 42 1/2[5]	— —	
Magnesium Ribbon or Wire	40[3]	—	
Magnesium Ribbon or Wire	100-200[7]	3" Trans. to 30'[3]	.03-.06
Mag. Rib. or Wire 0.3mm Wire	74[11]		
Lime Light	90-790[7]	12[6]	.16-1.4
Oxygen & Alcohol(Bube Light)	50[3]	—	
Oxygen & Common Gas	100[3]	—	
Oxygen & Hydrogen	125[3]	—	
Blow Thru Jet ("Gas & Oxy)	400-500[2]	—	
Mixed Jet ("Gas & Oxy)	800-900[2]	—	
Acetylene Gas	200-300[2]	—	—
Acetylene -4 Burner (Lilly & Co., 1899	500[4]	—	—
Arc Light	50-10,000[3]	—	
40 Grove's Cells	360[7]	—	—
48 Bunsen Cells	380[7]	—	—

*Calc. by: (Candle Power) (.20) (Assumes condenser makes a unit solid angle [Screen Area sq. feet] with the source; see text for explanation.)

To make sense out of Table 1 it is necessary to know a little of the science of photometry and its history. Broadly speaking photometry relates to the measurement of **visible light**. It is part of the science of radiometry which deals with the measurement of electromagnetic radiation at all wave lengths. Table 1 was generated by expressing the light "output" or more exactly the luminous energy per second or **power** of the various light sources in terms of the light output of a **standard candle**. The comparisons were made by "intensity matching" and utilizing the fact that light intensity falls off with the square of the

New lamps for old continued

to measure away from a reference screen until the "intensity" of illumination matches that of our "standard candle" placed one foot away. Squaring the distance in feet of our light source from the reference screen will give the "candle power" of our light source. Probably many, if not all, of the measurements in Table 1 were made with the simple "grease spot" photometer invented by Bunsen in 1844.

In this device a standard lamp of known candle power is positioned on a bar with the lamp to be tested. An opaque sheet of paper made translucent in the center with a grease spot is positioned between two light sources. The lamp under test is moved until the grease spot disappears or the intensity of the two lamps is equal.

The intensity of the lamps is given by: eql) $I = d^2 \; I \; d^2$

Where:

I - candle power of lamp under test
d = distance from screen
$I_\circ$ = candle power of standard reference lamp
$d_\circ$ = distance of reference lamp from screen

A fine example of an early Bunsen photometer can be seen in the restored Menlo Park laboratory of Thomas Edison, located in Henry Ford's Greenfield Village Museum, Detroit, Michigan. As one might guess, it was used to rate the "candle power" of early incandescent lamps.

Inspection of Table 1 will show considerable variation in the results obtained for a given light source. Part of the problem is that the flame sources used as standards, such as the candle mentioned earlier are not very "standard" at all! For example, the British "standard candle" was a sperm candle weighing six to the pound and burned 120 grams per hour. Its light output varied ± 20%. [10] [1]

Another problem is that for a photometer such as Bensen's to give the correct value the light source must be a **point source** - a criteria which generally can be met if the height of the light source is 1/20 or less than the distance to the measuring screen. A more severe problem is that of color. If lamps do not possess the same whiteness or spectral distribution in modern terms they cannot be compared using a simple photometer.

Of all the light sources listed in Table 1, the carbon arc has probably received the most attention. The light output of a carbon arc is chiefly dependent upon the current drawn by the arc and its type alternating (AC) or direct (DC). Carbon arc geometry also plays a role. These effects are presented graphically in figure 1, which was taken from Gage. [1] Note that DC arcs give much more light at a given amperage than AC arcs.

The figures for the battery operated arcs (Bunsen and Grove cells) are generally below those for the lime light and are interesting since up un-

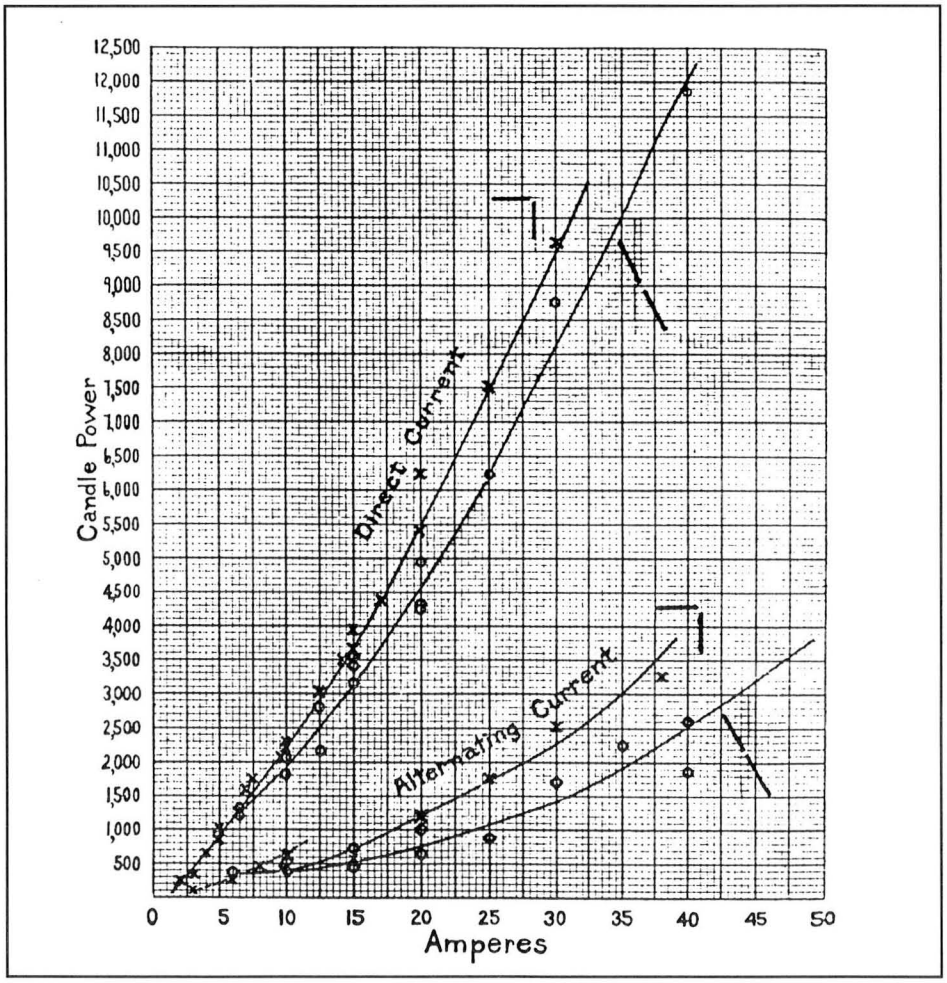


Figure 1
Variation in Intensity of Light from Projection Arc Lamps with Direct and with Alternating Current
x Right-angle arc
0 Inclined carbon arc

continued next page

til electric generators became readily available after 1880, the only source of current for an arc lamp was an electric battery. The light given by the burning of magnesium wire up top a point should depend strongly upon the size of the wire burned.

All of the sources in Table 1 are **incandescent light sources** and have much more in common with the incandescent lamp than at first might be realized. In the case of kerosene and gas lamps it is particles of carbon in the flame heated to incandescence which create the light. For a flame to be luminous it cannot be too hot, otherwise the carbon will be completely burned and no light will result. An example of this can be seen in the Bunsen burner, or its more sophisticated offspring, the common gas cooking stove. Here, the flames are "blue," hot and give off little light. In the Welsbach gas light a thin heat resistant gauze is heated by a "blue" gas flame resulting in more light which is not only brighter, but whiter than the ordinary yellow gas flame. The "Coleman Lantern" is a surviving example of the Welsbach principle.

The lime light is a further extension. The oxihydrogen flame is nearly invisible, but very hot - 2660° C. If a non-combustible material is heated in this flame it will give off light. Calcium oxide (unslacked limed) is one of the few materials which does not melt, vaporize or decompose rapidly at these temperatures in air, and hence makes a satisfactory source of light. Similarly, the burning of magnesium results in the formation of Magnesium Oxide (MgO), which is heated to incandescence by the intense heat of combustion.

The modern incandescent lamp uses tungsten as a filament, a material with a melting point of 3400° C. Since electrical resistance heating, as opposed to flames, has no upper limit for the temperature which can be reached, the only limiting factor is the **melting point** of the conductor. Since higher temperatures can be achieved in the incandescent lamp, the light output is greater.

To understand how to convert the candle power values of Table 1 to modern incandescent electric lamp equivalents, we must again revert to the science of photometry and introduce the idea of **flux**, or more exactly **luminous flux**, the total luminous energy emitted per second. It should be noted that modern standards dictate that the word **luminous** be prefixed to any photometric or visible light measurement. This conversion was not generally followed in many works prior to about 1979 or so—let the reader of early works beware!

Since a point of light source radiates in all directions, let us place our standard candle (candela in modern terms) in the center of an imaginary sphere of one foot radius. If we draw a circle on the surface of our sphere with an area of one square foot, the total luminous flux passing through this area is one **lumen**. If we let this circle be the base of a cone whose apex is the center of the sphere, the three dimensional angle of the apex of the cone is a **unit solid angle**. [2] Since the area of a sphere is $4\ \pi r^2$ where 'r' is the radius of the sphere, the solid angle around a point is 4π.

Table II

Modern Indcandescent Replacements for Antique Sources (Selected Values From Table I)

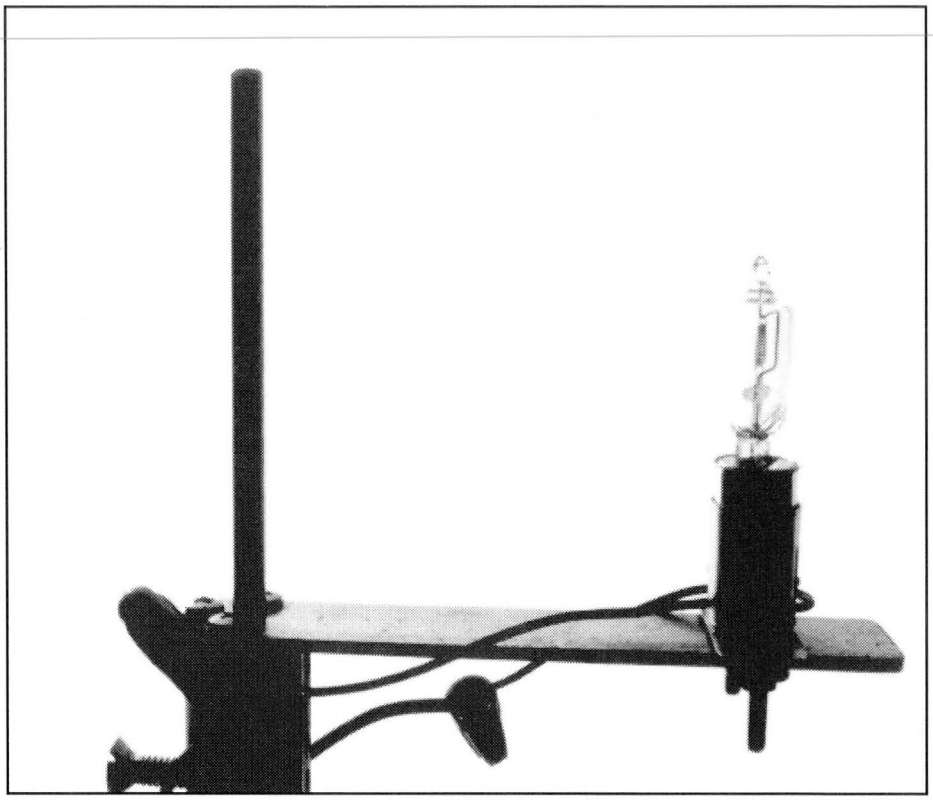
Source	Candle Power (Candela)	Lumens	Incandescent Lamp Replacement 16 Lumens/Watt — 2860K	Incandescent Lamp Replacement 28 Lumens/Watt — 3200K
Illuminating Gas	20 185	251.3 2324.8	15.7 145.3	8.9 83.0
Welsbach Gas Light	60	753.9	47.1	27.0
Kerosene	30 128	377.0 1608.0	23.6 100.0	13.5 57.0
Lime Light	100 500 900	1256.6 6283.0 11309.0	78.5 392.0 707.0	45.0 224.0 403.0
Acetylene	200 300 500	2513.0 3760.8 6283.0	156.0 235.5 392.0	89.0 134.0 224.0

Thus, to determine the total luminous flux or luminous power is give off by a one candle (candela) source in the center of a sphere of unit radius, we merely multiply by 4π or 12.566. Thus, by multiplying by 4π the value of "candle power" of Table 1 we calculate the total approximate luminous power of our light source. [3]

When you go to buy a light bulb at the local discount store you buy it by wattage. This refers to the **electrical power** that the bulb consumes. What you are really concerned with is **the power of visible light** available, and sure enough, this is always stated in lumens on the side of the carton. For the GE bulbs, the author pulled out of the closet when writing this article, the values were 11.6 -16.3 lumens per watt. It should be pointed out that running a bulb at higher wattage greatly increases the lumens per watts, but drastically reduces bulb lifetime. Thus, an ordinary 120 volt lamp can be doubled in light output by raising the operating voltage to 165 watts. However, the life of the bulb may be 15-20 lumens/watts The result of these calculations are shown in Table II. The first value, 16 lumens/watt refers to ordinary lamps of about 2860° K.

The second value is that of a projection lamp of 3200° K. The color temperature of a incandescent lamp refers to the temperature of the lamp filament. [4] The hotter the lamp is the run the whiter the light, the better the luminous efficiency and the short the lamp life.

Table II clearly suggests that a projection type bulb of 100-200 watts will make an excellent replacement lamp for the historic lantern.



Practical Alternatives

The author feel that the following bulbs make good retrofit for the lantern:

Bulb	Wattage
USH10 ESR Q100CL/Dc/2V/120V/100W	100 Watts
USH10 FEV 200W/120V/3200K/500hr	200 Watts

Socket 280-40 Mole Socket F/2801
Mini-mole

The socket is about one inch high and 1/2 inch in diameter and is easily mounted in the lantern with simple brackets made with hand tools. Be sure to make all brackets out of metal since temperatures near the lamp can be appreciable. The lamps are relative easy on the pocket book for projection type lamps with the 100 watt bulb being $11.50 each while the 200 watt bulb is about $9.00. The socket which fits both lamps sells for about $10.00. In figures 2 and 3, the lamps and socket can be seen with two lantern retrofits. These items are available from:

Victor Ducan, Inc.
23801 Industry Park Drive
Farmington Hills, MI 48335

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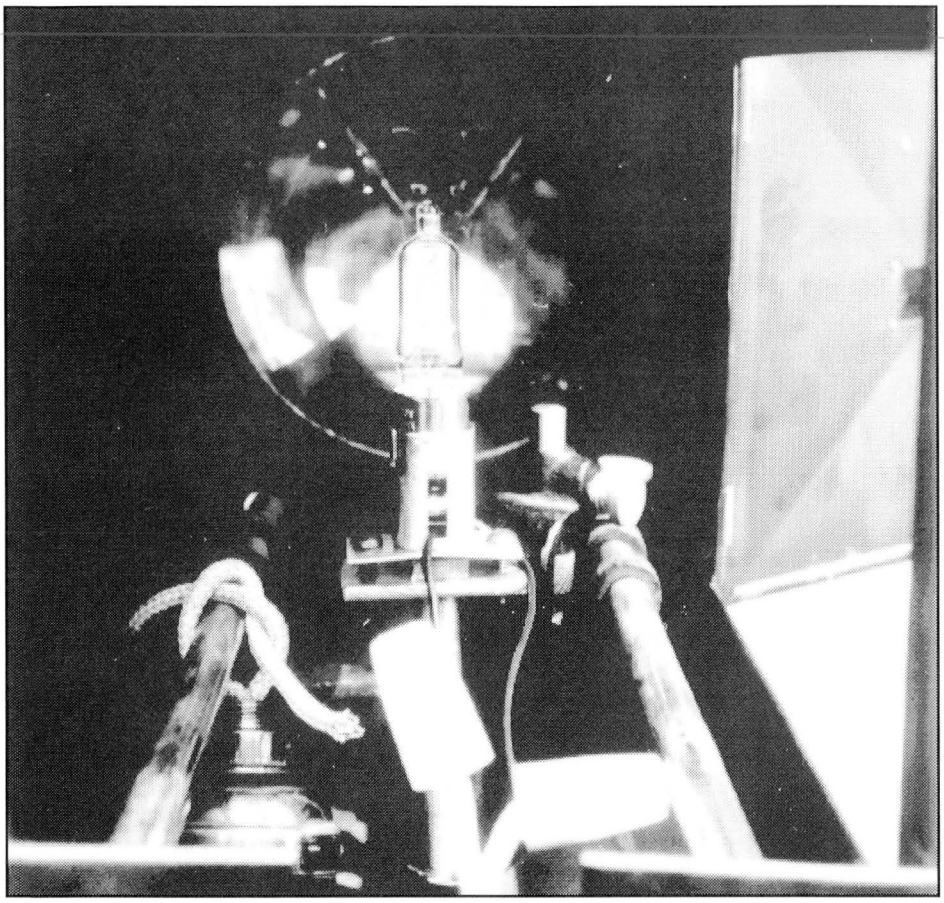

Victor Duncan specializes in the sale of lighting equipment and the rental of professional film and video equipment.

Since both lamps fit the same socket, one can fit the lamp to the screen size and brightness required. Both lamps are of the quartz halogen type which means that the lamp is filled with iodine vapor to suppress blackening of the bulb with age. As a tungsten filament lamp is operated in a normal lamp, the tungsten slowly evaporates and deposits on the inside of the bulb. The result is that the light output falls off with age. In the tungsten halogen lamp the iodine (I) reacts with the tungsten (W) vapor to form a chemical compound, (WI_2). This evaporates off the bulb at 250°C and is decomposed back to tungsten and iodine when it touches the hot filament. Although the lamp operates at a temperature of over twice the the boiling point of water (100°C), the lamp's small size means that convection cools it very well and little heat reaches the condenser lenses. When installing or replacing quartz halogen lamps, **do not handle them with the fingers.** Oil and grease contamination from such handling will appreciably shorten lamp life. Use the plastic cover supplied with each lamp to handle it and slip this off once the lamp is installed. Save the box and cover if you plan to change lamps around or from lantern to lantern. If you do accidently touch the lamp, wash it off with a lint free tissue and alcohol. Rember quartz-halogen lamps **run hot** - at least 250°C. If you burn one out, wait until it is cool before replacing or use a suitable hot glove.

It has been the author's experience that the lantern runs quite cool with these lamps. With the 200 watt lamps installed in a Brenkert biunal lantern, originall fitted with 250 watt lamps, 3 1/4" x 4" photographic glass slide is cold to the hand and barely warm to the cheek after being in the lantern for one minute. Both lamps had been running for more than one hour when the test was made. It is important that these lamps reach the required 250°C surface temperature required for the quartz halogen cycle to operate. Therefore, run them with doors to the lantern closed and avoid draughts of air—convention currents should dissipate the heat quite nicely.

SCREEN ILLUMINATION - The Central Issue

Of all the lumens which are produced by the lamp and made available by the condenser, only about 20% or less of them ever reach the screen. To understand how this statement can be used to calculate screen "brightness" we must introduce another term from the science of photometry a unit of light "intensity" correctly called **illuminance**. The illuminance in the luminous power per unit area falling on a surface and the unit we will use is the foot candle. If a source of one candle (candela) is one foot from a spherical surface, then the luminous power falling on one square foot is said to be one foot candle.

Incident light meters used by photographers are generally calibrated in either foot candles or lux. A lux is the metric equivalent of a foot candle with the units of measurement being the meter. There about 11 lux per foot candle.

The "brightness" of a screen is not the same as th illuminance but depends on the screen (illuminance) and the reflectivity of the screen. We shall say more of screen brightness later.

The losses of light start in the lantern with the condenser system. Most condenser systems accept a unit solid angle of illumination so that we have a source of 1000 candle power, the total luminous flux will be 1000 lumens. The losses through the lantern are as follows:[12]

Condenser (-30%)
Deduct 4% for each air glass - air interface
Deduct 5% for each centimeter of glass through which the light must pass.

Slide-Carrier (-50%) of remaining 70%
Deduct 50% due to slide carrier (rember the slide is often square or rectangular and we must have sufficient condenser areas to illu minate the diagonal of the slide).

Slide or Film(15%) of remaining 35%
These losses are due to reflection and absorption.

Projection Lens (-30%) of remaining 29.75%

Final (-20%) or ca 20%
Thus in our example, out of 1000 lumens only 200 are available for projection.

Screen brightness is given by the expression:

eq3

$$\text{Lumens Required} = \frac{\left[\begin{array}{c}\text{Desired Brightness} \\ \text{in foot - lamberts}\end{array}\right]\left[\begin{array}{c}\text{Area of Screen} \\ \text{Square Feet}\end{array}\right]}{\left[\begin{array}{c}\text{Reflection Coefficent} \\ \text{Expressed as Decimal}\end{array}\right]}$$

If the reflection is 100% from the screen, this the reflection coefficient becomes unity. Under these conditions the illumination of the screen is expressd in foot candles. Thus if we have 200 lumens from our lantern available (remember we started with 1000 at the condenser) and we wish to illuminate a screen of 7 foot square (49 square) feet, our illumination in foot candles is:

$$\text{Foot-candles} = \frac{\text{lumens}}{\text{area}} = \frac{200}{49} = 4.08$$

Johnson states that 4-5 foot candles (lumens per square foot) is a fairly acceptable screen illumination.[12]

One should also mention the brightness standard for 35mm motion picture film projection which states that the brightness in the center of the screen should be 10, (+4), (-1) foot-lamberts when the projector is running with no film inthe gate (ASA standard 222.39-1944) [9] With a 70% reflection factor this would imply illuminations of ca 14 foot candles.

In the last column of Table 1 the screen illumination has been computed for the image sizes listed. In all cases the illumination is only a small fraction of the modern recommended values.

No wonder early projection manuals advised that the audience sit in a dark room for 1/2 hour or so to become dark adapted! With nighttime shows in an era of kerosene and gas lamps, audiences may have been much better dark adapted without the wait that they would ever be today. Robertson's Phantasmagoria of the 1790s was exhibited in an abandoned chapel "feebly illuminated by a single sepulchral lamp". When the show began, even that was extinguished and the audience sat in the dark listening to "a storm of rain, wind and thunder" before the apperations would start to appear.[13]

We are also now in a position to do some speculation about the potential damage to slides due to projection. Current museum practice recommends that "light sensitive" materials, i.e, textiles, etc. be subjected to illuminations no greater than 50 lux or 4.6 foot candles. If we assume the museum is illuminated for 8 hours each day, we have 8 x 60 x 4.6 = 2208 foot-candle minutes being and acceptable daily exposure. If we use a 200 watt projection lamp with an efficiency of 28 lumens per watt we have a total light flux of 28 x 200 = 5600 lumens available.

Since the lantern condenser generally accepts a unit solid angle and the light radiates in all directions we must divide by 4π (4π solid angles in a sphere) so that our condenser is accepting 446 lumens allowing a 50% reduction for the slide carrier we are down to 223 lumens on the slide. Since the area of the slide is only 3 1/4" x 4" (American Standard) the area is only .09 square feet. This gives a whopping **2470 foot candles** of illumination on the slide. This means that if we project a slide for one minute we are giving more light exposure than the permissible daily light exposure recommended for sensitive museum objects. (2208 foot-candle minutes). Our caculations assume that degradation is linear with time and intensity —it could be much, much worse if non-linear. Colored slides should certainly be projected under the conditions outlined for no more than one minute/day - once every 10-30 days would probably be much safer. this probably is not a problem with most collectors but might be a real concern to anyone who gives lantern shows on a regular basis. The 20% rule outlined earlier applied to the 200 watt lamp just mentioned would indicate that a 7' wide projected image would have an illuminance of a very modest 2 foot candles.

In conclusion then it is very important that the light in the lantern be burned as low as possible both for an authentic re-creation of projection conditions and to prevent the degradation of colored slides.

continued next page

There is an argument not to project colored slide at all and to make photographic reproductions for this purpose. The author feels that this viewpoint is over conservative since no data on slide fading exists. However, the magic lantern has been an extinct beast for less than 100 years and already comparatively little remains. What remains in 500 years depends very much on what we as collectors do today!

As a final word, it has been pointed out both in these pages and elsewhere that of all forms of illumination **daylight** is the most harmful because of its high U.V. content. Ultraviolet light is highly destructive to many colors and should be avoided at all costs. **Do not** display lantern slides in the window. Serious damage can occur in a matter of months!

So in conclusion, keep the lantern light low! If you enjoy projecting lantern slides rember what you do today will determine whether future generations will be able to enjoy a similar experience.

END NOTES

[1] Standard light sources have always been a problem. As was mentioned, the earliest standards were candles. As late as 1950 in some texts the standard candle was "officially" defined as 1/10 of the intensity of the flame of the Vernon Harcourt pentane lamp burning a mixture of air and pentane under standard conditions. [(8)] In practice a series of incandescent lamps in possession of National Standards laboratories around the world were used. In the 19th century Violle proposed as a standard of brightness the light emitted by a square centimeter of platinum at its melting point. [(10)] In 1948 Voille's concept was adopted by the International Committee of Weights and Measure and the **Standard Candle**, or in modern terms, the **candela**, is the source of intensity of 1/60 cm^2 of opening of the standard light source consisting of a glowing cavity (black body) maintained at the temperature of solidifying platinum.

[(2)] The solid angle of a cone (w) where apex is the center of a sphere is defined on the surface of the base (s) divided by the square of the radius of the sphere (v).

eg2) $W = \frac{S}{r^2}$

The unit solid angle is the **Steraeadin.** Note that equation does not specify the shape of the area. We used a circle in our example but any shape is valid.

References

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[3] At this point it is well to mention that power measured in the central measurement is radiometry, and that power as sensed by the human eye is the central measurement of photometry. Photometry grew out of a need to compare the illumination characteristics of light sources and the response of the human eye must be taken into account. The eye is most sensitive to **yellow green** light with a wave length of 55nm (some cities paint fire trucks yellow green on the assumption that they will be more visible than those of the traditional red). At this wave length, 680 lumens equal one watt and the luminous efficiency is said to be unity. At other wave lengths the eye is less efficient. At 510 nm in the green region of the spectrum, the luminous efficiency is 0.503 so that one watt gives only 680 x .503, or 342 lumes. In the ultraviolet or infrared region the luminous efficiency is zero for the eye does not function at all in these regions of the spectra.

[4] If an object is heated it will emit radiation. When an object is first heated it emits "light" in the infrared region and is "hot" but not visible to the eye. As the temperature is increased the wave length of the emitted radiation is shifted to shorter values and the object becomes first red then yellow, and finally "white hot." The color temperature is the temperature in degrees Kelvin of the body giving off the light. Thus, ordinary incandescent lamps are about 2860 °K, and photo floods or projection lamps run from typically 3200-2400° K. Daylight photographic films are balanced to about 5000° K. The concept does not hold for light sources which do not derive their light from heated objects, i.e. florescent lamps.

THE KLONDIKE LANTERN

SUBMITTED BY
BOB BISHOP (T.O.P.)

'Sourdough:' "sour on the land but no dough to get out." By this definition I never met a sourdough. On the contrary those people of Whitehorse we did meet, all seemed content and most expressed no desire to be elsewhere.

This was our third trip to Whitehorse, named after the rapids on the Yukon close by, which early trappers and gold seekers thought resembled the manes of galloping horses. Our last two trips were at the invitation of the MacBride Museum Society and funded mostly by the Yukon Lotteries. Also making our trips possible were the Taku Hotel in '89 and the Westmark Klondike in '93. In '89 air transport was provided by Canadian Air, round trip Vancouver to Whitehorse.

Society member Jim Robb was probably the person who made information available regarding The Last Magic Lantern Show to the MacBride Museum Society. It was not as if we were the first lanternist to reach the Klondike. Others had been there during the Gold Rush. Jim Robb has a flyer of F.R. Allen, BA, who apparently made a pass through the territory. But that was a long time ago.

In '89 our three programs drew turn away crowds to the MacBride Museum. Reservations were necessary but no admission charge was required. In '93, one workshop, four adult programs plus one 'Children's' show were presented with a modest admission fee required. Again, we played to capacity crowds in the largest room of the museum. Originally scheduled were but three adult shows. Additional adult show followed the children's program on Saturday afternoon, February 27. On quick notice Peter Novak, of CBC radio, made two or three announcement spots on his various talk shows. As a result the extra program was very nearly sold out.

One must not assume the evident popularity of a magic lantern show was because of the size of Whitehorse (23,000), or its remoteness. It has a modern airport, excellent hotels, many TV channels, two daily newspapers, excellent hotels, and especially during the ten day Rendezvous Festival, much live entertainment in the Hotel lounges, cocktail bars and beer parlors. Now during the festival, inhibitions are forgotten, people from far and near flock to town. The hotels are full, the cabs busy on the icy streets. The barmaids and waitresses are dressed in Gay Nineties garb. The barkeeps too are mostly in costume as are many members of the public.

As a matter of fact, the day after the festival ended I saw my favorite waitress in normal garb. I remarked, "Mary, I hardly know you with your clothes on." I was served burnt toast! Of course, they play to the outsiders, the tourists and consequently many of the productions are quite blue. But it was in one of these lounges at the Klondike Westmark that Bernie and Red, English pub type entertainers, announced they had seen The Last Magic Lantern Show and that it was a 'gentle' show and all should see it. (In our next program several people noted they had come because Bernie's and Red's announcement.) Nice words, indeed. The program seemed to grow in strength as the Rendezvous neared the end of its ten day run.

Tug-a-truck, tug-of-war on the icy streets, pie eating contest, snow shoe,

continued next page

Klondike Lantern continued

can can contest, mime contests (I still remember the wondrous feature in the '89 contest, One Night in Bangkok!), melodramas, 'The Shooting of Dan McGrew,' an air show and a Frost Bite Music Festival, along with too many more to properly enumerate in this short article. Despite the bawdy themes at the lounges and other outlets, the Festival claims that 75% of the features were family oriented.

It might be of interest for the reader to know that just getting the show lantern and slides to Whitehorse was a most formidable challenge. The lanterns and slides came to a total of 150 pounds. First packed show-by-show, I then realized it was far too many pieces of luggage. So the slides were repacked by placing all the lantern slides into a five inch by fourteen inch by twenty inch carry bag. Heavy! Then all wooden framed slides were packed separately into a solid carry bag. Any panoramic slides and other magic lantern slides went into a suitcase along with a Gloria, (EP) lantern and controls for the show lantern. In this manner we were able to keep all the magic lantern material away from the cargo hold, thus keeping them under our observation at all times.

The Canadian Customs and Excise Department, when contacted by Brenda Carson of the MacBride Museum Society, issued us a letter allowing us to transport the material in and out of Canada without a security deposit. For all intent and purpose there was no inspection, either in or out, thus saving hours of time. So again we were well received in Whitehorse. I am pleased to note the MacBride Museum Society is considering starting their own Magic Lantern program. They aspire to tell of the heritage of the Yukon and to develop their own lantern department to tell the story. In addition, another Whitehorse photographer, John Hatch, is making noises about becoming a magic lantern projectionist. It is probable both John Hatch and the Museum will become members of our Society.

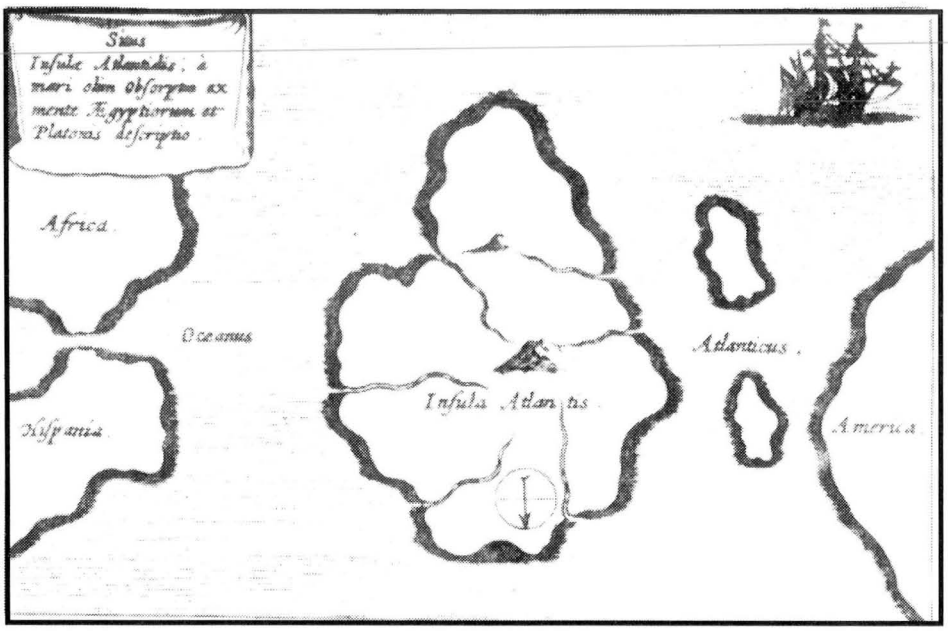
So a well attended workshop was held. The story told and copies of the N.W. newsletter passed around. The first and third shows gave the "Message from the Good Ladies of WCTU." The second and fourth and fifth shows told the story of "Where is My Wandering Boy Tonight." The children's program on Saturday afternoon consisted of "A Trip to the Land of Light and Shadow." A packed house, children jammed together on the floor, ringing bells, blowing whistles, roaring like tigers when the "Tiger and Tub" was shown, a most memorable program.

So again we showed the lantern's light in the Yukon and it was a good throw. But bright as was the lantern's light it could not compare with the display of Mother Nature when on our last evening in Whitehorse the northern lights illumined the sky as we prepared for the journey home. And that is good enough for—The Old Projectionist.

A DIFFERENT NOTE ON KIRCHER

FROM CHARLES BERLITZ'S
THE MYSTERY OF ATLANTIS

SUBMITTED BY BOB BISHOP



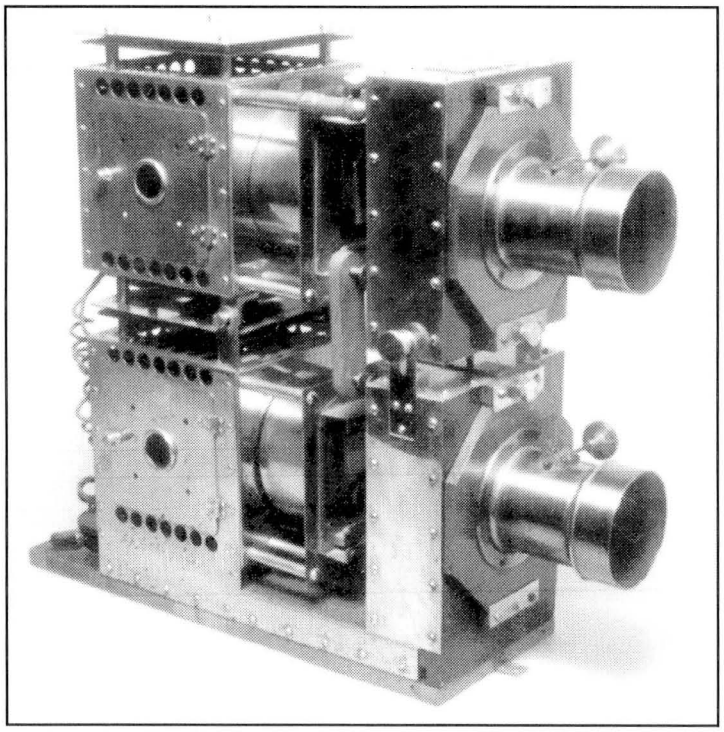
Father Kircher, Jesuit priest, seemed always on the cutting edge of discovery. Called a charlatan by such eminent scientist as Christian Huygen, nevertheless the old priest was a mathematician, prolific writer, poet, and inventor. There seemed to be no field of study where his name was not mentioned.

So I suppose I should not have been surprised when I found what was obviously his name with a different spelling, 'Kirsher' (page 141) in Charles Berlitz's book, *The Mystery of Atlantis.* Kircher's contribution, according to Berlitz, was a 'famous map of Atlantis and its relationship to Europe and America.' The reader might notice in the illustration the map is upside down according to the arrow which indicates north.

This fact might puzzle some readers but not his writer. Kircher sent his drawing of Atlantis to the same engraver in Holland who previously had done the engraving of Kircher's early lantern with the slide obviously upside down. The engraver was not about to make the same mistake twice!

Jean Bailly, a French astronomer prior to the French Revolution, in a study of Atlantis, which he placed in the far north, when the Arctic was tropical. Voltaire was thought to have shared the opinion of Bailly, although this is difficult to prove, especially in view of Voltaire's lack of faith in most of the institutions of his day.

Vertical Biunnal
A.D Handy Co.
Boston, 1900



MR. SMITH AT CALAIS

The following was sent in by Nancy Bergh as a result of some of Margaret's research in Calais, Maine, after the convention in San Antonio, Texas. The editor has taken the liberty of extracting those portions pertinent to the lantern.

Calais, Maine, Jan. 7, 1904, St. Croix Hotel

Dear Union:

As you will see by my date line, I got here all right from Portland and am comfortably situated considering the terrible cold weather and the fact that there is no competition in the hotel business here.

Both hotels are owned by one company, so the clerk told me this afternoon, but I suspected it when I read the bill of fare.

They are nice folks here. When I registered, I asked for a cigar and the manager told the cigar man not to take any pay for it. "If you do," he says, "He'll write you up in the *Union*."

If it hadn't been for that I should kick a little on their steak, which was tough, but on account of the cigar, Mr. Conant, and the neatness of the rooms, I guess I'll keep quiet.

When I left off last time, I was about to tell you of Ed Swett's call on me in Portland. Swett's the man who is going out to the fair at St. Louis and do the talking, in a log cabin. He's got a lecture, called "Picturesque Maine," that he delivers. It takes him just an hour and forty minutes to repeat it. I timed him twice the night he came to see me and he hit just alike both times.

He also has a magic lantern that goes with it which he is going to take out with him and show those St. Louis people, who probably never saw one.

I see there's been some kicking on this St. Louis business, and not understanding it very well, I asked Swett about it.

I shall spring the magic lantern on them and lecture

He told me the kick that was made was all jealousy. He said if the Governor had put Goodwin and Obediah Gardner on the commission and fixed it so that they could have given a representation of a county fair there, with a chance for them both to talk at one, everything would have been lovely. "But," he says, "How much better is the present arrangement. How pleased those citizens of an older state will be to learn that we, in this lately settled portion of the country have reached a stage in civilization where, when we build a log cabin, we peel our logs. Why, when Governor Hill, in completing his residence at Augusta, he had a carload of brick come from St. Louis by express. They thought out there that we lived in wigwams and they sent the brick C.O.D. for fear he would want to pay for them in wampum. When they see that we have reached the peeled log stage, they will be surprised and then before they fairly recover themselves, I shall spring the magic lantern on them and lecture. What do you think they'll think then"

"They'll know we ain't Esquimaux," says I, desiring to speak politely to him and still not feeling as if I needed to praise the scheme extravagantly.

"Exactly, says he, "And that will be a great gain for us, because the last they heard of Maine was when Lew Powers made a speech there in '96. My address will illustrate our great advance since then, I shall tell them of Maine, our hills and lakes and rocky coast."

"I believe you will," says I, "If they give you an opening, because you seem to like to, but what bothers me is, why we don't go out there and blow about something WE did and are doing. We didn't make the hills. In fact, out in Meddybemps we've worked out lots of taxes trying to cut 'em down. And as near as I can understand the lakes and rivers and rocky coast have been here some time. The Indians had them years ago. Don't you think that our farms and factories and schools and politicians and railroads and all of them things would interest them?"

He looked at me sort of sad and as if he'd lost a friend. He sat down on the side of the bed and put his head on his hands and he sort of sobbed and then he recovered himself and he says: "Where would the magic lantern get in on that play?"

I understood then and it just illustrates that fact that one little word of frank explanation will straighten out a whole lot of misunderstanding. The thing was this way.

Governor Hill had to have the St. Louis appropriation to show his wife's folks out there that he wasn't broke.

Ed Swett put the bill through the house, so he had to go with the appropriation. Ed couldn't go without his magic lantern. The magic lantern don't fit any other industry except hunting and fishing which brings in the log cabin and completes the circle.

Editor's note: There is a whole series of slides and books on the St. Louis Fair.

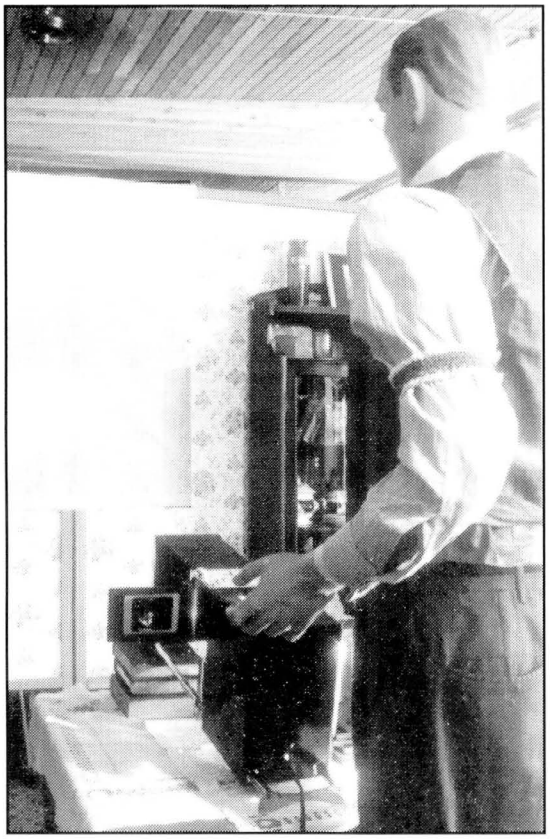
MAGIC LANTERN DISPLAY

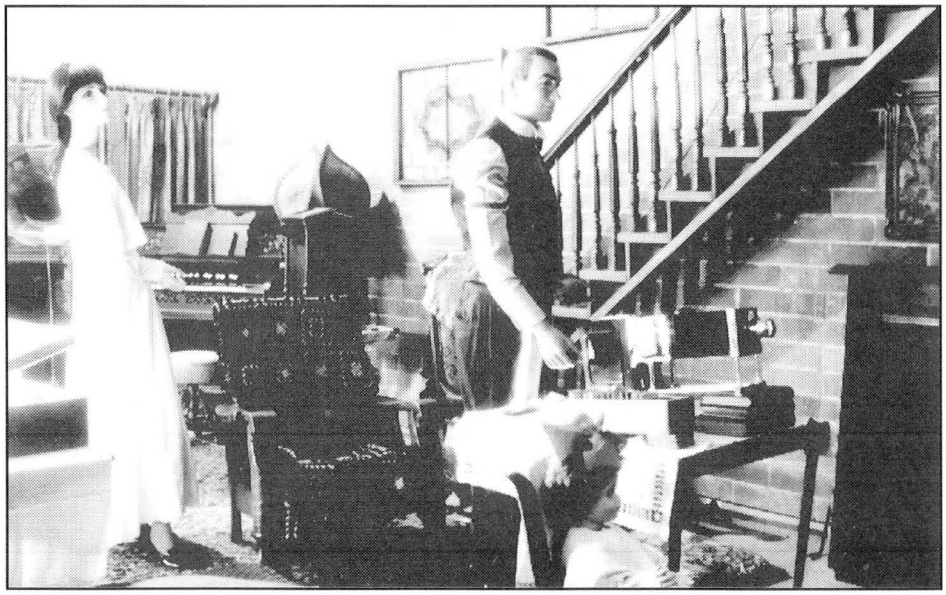
CONTRIBUTED BY ALICE AND JOE KOCH

Alice and I have been active in the White River Valley Historical Society and Museum in Auburn, Washington for the past 30 years. Over that time we have contributed time, money and blood—all well spent. We now have a paid professional director who has wrought wonders over the 18 months she has been with us.

She recently organized a photographic exhibit of one of our old time photographers, L.W. Clark of Kent, Washington. He photographed many valley pictures from 1902 until World War II. To fill out the exhibit, she asked Alice and I to set up a magic lantern show (still life) in the parlor of the museum. We started with the lantern using a 150 watt clear bulb, a colorful slide showing a young girl behind bars; adjacent is a lectern light with some 100 year old readings alongside. The screen is an off white muslin and at a distance about six feet. It shows the image quite well. The Lanternist, Ernie, the male mannequin dressed in period clothing (1880), spectacles, and the ability to hold a wood-mounted slide in his hand, looks quite magnificent. In the front of the parlour is a 14" x 18" light box with a small florescent light source. On the light box are three wood mounted slides, toy slides, glass slides and three paper bound slides. The colors and scenes are quite striking. It remains lit four hours per day, as does the lantern four days per week. Ernie, our mannequin, has served us well as store clerk, railroad conductor, drum major, and now a lanternist. Also, in the living room is a large table top, cabinet stereo viewer. With one case left to be filled, Alice and I put in our stereo viewer collection consisting of one Brewster type viewer, three metal folding viewers (with cards), one French wooden viewer for glass stereo slides (ca.1865), and lastly, our View-Master collection, 1939-1992, all models represented. Included are advertising pamphlets and catalogues 1942 to 1992.

There was no room for our Tru-vue collection, so that will happen sometime in the future.





STEREOSCOPIC EFFECT IN LANTERN-SLIDES

LIFTED FROM
***PHOTO ERA MAGAZINE*, 1908**

SUBMITTED BY
JOE AND ALICE KOCH

Too great familiarity with one of the most valuable and effective means of education—the lantern-slide—is no excuse for its neglect or even threatened disuse in favor of moving pictures. Time was when the camera clubs showed some exquisite specimens of the art of lantern-slide making, the camera clubs of New York and Philadelphia excelling in the production of this beautiful means of entertainment. Although there is still considerable enthusiasm displayed in the making and projection of lantern slides, especially as maintained by the Lantern-Slide Interchange, the matter is considerably neglected in many quarters. Nevertheless, the popular lecture continues to be illustrated by means of lantern slides which, in many cases, are of the highest technical excellence. A case in point is a series of lectures prepared and delivered by Herbert W. Gleason, of Boston, who is a skilled and experienced photographer, and equally successful in the production of lantern-slides. His recent lecture at the Massachusetts Institute of Technology, the subject being "The Sierras of California," was a notable example in this respect. His slides excel, as do few that we have seen, in chemical quality, depth of perspective and atmospheric and stereoscopic effects. These features were a source of unstinted admiration from the many connoisseurs present. Upon inquiry we find that the qualities which distinguish Mr. Gleason's lantern-slides are due to the large negatives employed in their production, an 8 x 10 camera and a lens-stop of about F-22 being used for this purpose in most cases. Of course Mr. Gleason does not confine himself to the use of large cameras for negatives intended for lantern-slides, but uses also a 3 1/4 x 4 1/4 reflecting camera, when very rapid exposures are called for. Slides from these smaller negatives are, of course, made by contact, but then the quality differs considerably from that obtained from larger plates. In either case the brand of plates to be used and the make-up of the developer are chosen for each slide.

The following was lifted from the same publication and considered worth reprinting.

A feature of the lecture on color photography, which brought down the house, was when, just before they projected the autochrome of the American Girl—a portrait of his daughter—Mr. Parkinson delivered the following lines: The French girl is vivacious; the German girl, sentimental; the Italian girl, passionate; the Spanish, romantic; the English, queenly; but blend together the English queenliness, the Spanish romance, the Italian passion, the German sentiment and the French vivacity; add beauty, grace, wit; then spice the mixture with a dash of irrepressible independence and you have God's best gift to man—the peerless American girl.